

Docket No.: M4065.0698/P698-A
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Kristy A. Campbell, et al.

Application No.: NEW

Confirmation No.:

Filed: December 17, 2003

Art Unit: N/A

For: METHOD OF FORMING NON-VOLATILE RESISTANCE VARIABLE DEVICES, METHODS OF FORMING A PROGRAMMABLE MEMORY CELL OF MEMORY CIRCUITRY, AND A NON-VOLATILE RESISTANCE VARIABLE DEVICE

Examiner: Not Yet Assigned

INFORMATION DISCLOSURE STATEMENT (IDS)

MS Patent Application
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Pursuant to 37 C.F.R. § 1.56, the attention of the Patent and Trademark Office is hereby directed to the documents listed on the attached PTO/SB/08 and to the specific citations listed in Appendix A of this Supplemental Information Disclosure Statement. It is respectfully requested that the subject matter of these documents and citations be expressly considered during the prosecution of this application and that the documents be made of record therein and appear among the "References Cited" on any patent to issue from this application.

This Information Disclosure Statement accompanies the new patent application submitted herewith.

The patents and publications listed in the attached form PTO/SB/08 are not supplied because they were previously cited by or submitted to the Office in prior U.S. Application No. 09/943,190, filed August 29, 2001 and relied upon in this application for an earlier filing date under 35 U.S.C. 120.

This request to review documents and specific citations is not an admission that a particular document is “material” or that it qualifies as prior art. Furthermore, this list of specific citations is not intended to be exhaustive of all relevant materials. Thus, it is respectfully requested that the Examiner thoroughly review all references, including those cited in the attached form PTO/SB/08, for relevance to the claimed invention.

A brief explanation of relevance of the non-patent documents listed on form PTO/SB/08 is provided and attached hereto as Appendix B. The brief explanation provided for each document is not tantamount to an admission that a document is “material” or that it qualifies as prior art. The Examiner is respectfully requested to utilize Appendix B only as a tool by which to better categorize the documents for substantive use in examining the claims of the application.

Documents discussed in Appendix B marked with an asterisk (*) are indicated to be potentially more relevant than others. Such marking is provided only to assist the Examiner; however, the Examiner is requested to thoroughly review all documents cited herein.

In accordance with 37 CFR 1.97(g), the filing of this Information Disclosure Statement shall not be construed to mean that a search has been made or that no other material information as defined in 37 CFR 1.56(a) exists. In accordance with 37 CFR 1.97(h), the filing of this Information Disclosure statement shall not be construed to be an admission that any patent, publication or other information referred to therein is “prior art” for this invention unless specifically designated as such.

It is submitted that the Information Disclosure Statement is in compliance with 37 CFR 1.98 and the Examiner is respectfully requested to consider the listed references.

The Director is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 04-1073, under Order No. M4065.0698/P698-A.

Dated: December 17, 2003

Respectfully submitted,

By 

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Substitute for form 1449A/B/PTO <h2 style="text-align: center;">INFORMATION DISCLOSURE STATEMENT BY APPLICANT</h2> <p style="text-align: center;">(Use as many sheets as necessary)</p>				Complete if Known	
		Application Number	NEW		
		Filing Date	December 12, 2003		
		First Named Inventor	Kristy A. Campbell		
		Art Unit	N/A		
		Examiner Name	Not Yet Assigned		
		Attorney Docket Number	M4065.0698/P698-A		
Sheet	1	of	8		

U.S. PATENT DOCUMENTS						
Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	
		Number-Kind Code ² (if known)				
AA	6,473,332	10/2002	Ignatiev et al.			
AB	4,316,946	1/1982	Masters, et al.			
AC	4,419,421	12/1983	Wichelhaus, et al.			
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AG	2003/0027416 APP	2/6/2003	Moore			
AH	2003/0001229 APP	1/2/2003	Moore et al.			
AI	2002/0127886 APP	9/12/2002	Moore et al.			
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AS	6,469,364	10/22/2002	Kozicki			
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AU	US 2002/0000666	01/03/2002	Kozicki et al.			
AV	5,500,532	03/19/1996	Kozicki et al.			

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	
		Country Code ³ -Number ⁴ -Kind Code ⁵ (if known)				
	BA	WO 97/48032	12/18/1997	Kozicki et al.		
	BB	WO 99/28914	06/10/1999	Kozicki et al.		

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. ¹ Applicant's unique citation designation number (optional). ² See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
	CA	Abdel-Ail, A.; Elshafie, A.; Elhawary, M.M., DC electric-field effect in bulk and thin-film Ge ₅ As ₃₈ Te ₅₇ chalcogenide glass, Vacuum 59 (2000) 845-853.	
	CB	Adler, D.; Moss, S.C., Amorphous memories and bistable switches, J. Vac. Sci. Technol. 9 (1972) 1182-1189.	
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	CD	Affifi, M.A.; Labib, H.H.; El-Fazary, M.H.; Fadel, M., Electrical and thermal properties of chalcogenide glass system Se ₇₅ Ge ₂₅ -xSbx, Appl. Phys. A 55 (1992) 167-169.	
	CE	Affifi, M.A.; Labib, H.H.; Fouad, S.S.; El-Shazly, A.A., Electrical & thermal conductivity of the amorphous semiconductor GexSe _{1-x} , Egypt, J. Phys. 17 (1986) 335-342.	
	CF	Alekperova, Sh.M.; Gadzhieva, G.S., Current-Voltage characteristics of Ag ₂ Se single crystal near the phase transition, Inorganic Materials 23 (1987) 137-139.	
	CG	Aleksiejunas, A.; Cesnys, A., Switching phenomenon and memory effect in thin-film heterojunction of polycrystalline selenium-silver selenide, Phys. Stat. Sol. (a) 19 (1973) K169-K171.	
	CH	Angell, C.A., Mobile ions in amorphous solids, Annu. Rev. Phys. Chem. 43 (1992) 693-717.	
	CI	Aniya, M., Average electronegativity, medium-range-order, and ionic conductivity in superionic glasses, Solid state Ionics 136-137 (2000) 1085-1089.	
	CJ	Asahara, Y.; Izumitani, T., Voltage controlled switching in Cu-As-Se compositions, J. Non-Cryst. Solids 11 (1972) 97-104.	
	CK	Asokan, S.; Prasad, M.V.N.; Parthasarathy, G.; Gopal, E.S.R., Mechanical and chemical thresholds in IV-VI chalcogenide glasses, Phys. Rev. Lett. 62 (1989) 808-810	
	CL	Baranovskii, S.D.; Cordes, H., On the conduction mechanism in ionic glasses, J. Chem. Phys. 111 (1999) 7546-7557.	
	CM	Belin, R.; Taillades, G.; Pradel, A.; Ribes, M., Ion dynamics in superionic chalcogenide glasses: complete conductivity spectra, Solid state Ionics 136-137 (2000) 1025-1029.	
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	CO	Benmore, C.J.; Salmon, P.S., Structure of fast ion conducting and semiconducting glassy chalcogenide alloys, Phys. Rev. Lett. 73 (1994) 264-267.	
	CP	Bernede, J.C., Influence du metal des electrodes sur les caracteristiques courant-tension des structures M-Ag ₂ Se-M, Thin solid films 70 (1980) L1-L4.	
	CQ	Bernede, J.C., Polarized memory switching in MIS thin films, Thin Solid Films 81 (1981) 155-160.	
	CR	Bernede, J.C., Switching and silver movements in Ag ₂ Se thin films, Phys. Stat. Sol. (a) 57 (1980) K101-K104.	
	CS	Bernede, J.C.; Abachi, T., Differential negative resistance in metal/insulator/metal structures with an upper bilayer electrode, Thin solid films 131 (1985) L61-L64.	
	CT	Bernede, J.C.; Conan, A.; Fousenan't, E.; El Bouchairi, B.; Goureaux, G., Polarized memory switching effects in Ag ₂ Se/Se/M thin film sandwiches, Thin solid films 97 (1982) 165-171.	
	CU	Bernede, J.C.; Khelil, A.; Kettaf, M.; Conan, A., Transition from S- to N-type differential negative resistance in Al-Al ₂ O ₃ -Ag ₂ -xSe _{1+x} thin film structures, Phys. Stat. Sol. (a) 74 (1982) 217-224.	
	CV	Bondarev, V.N.; Pikhitsa, P.V., A dendrite model of current instability in RbAg ₄ I ₅ , Solid State Ionics 70/71 (1994) 72-76.	
	CW	Boolchand, P., The maximum in glass transition temperature (T _g) near x=1/3 in GexSe _{1-x} Glasses, Asian Journal of Physics (2000) 9, 709-72.	
	CX	Boolchand, P.; Bresser, W.J., Mobile silver ions and glass formation in solid electrolytes, Nature 410 (2001) 1070-1073.	
	CY	Boolchand, P.; Georgiev, D.G.; Goodman, B., Discovery of the Intermediate Phase in Chalcogenide Glasses, J. Optoelectronics and Advanced Materials, 3 (2001), 703	
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		steps in chalcogenide glasses, Properties and Applications of Amorphous Materials, M.F. Thorpe and Tichy, L. (eds.) Kluwer Academic Publishers, the Netherlands, 2001, pp. 97-132.	
	CA1	Boolchand, P.; Enzweiler, R.N.; Tenhover, M., Structural ordering of evaporated amorphous chalcogenide alloy films: role of thermal annealing, Diffusion and Defect Data Vol. 53-54 (1987) 415-420.	
	CB1	Boolchand, P.; Grothaus, J.; Bresser, W.J.; Suranyi, P., Structural origin of broken chemical order in a GeSe ₂ glass, Phys. Rev. B 25 (1982) 2975-2978.	
	CC1	Boolchand, P.; Grothaus, J.; Phillips, J.C., Broken chemical order and phase separation in GexSe _{1-x} glasses, Solid state comm. 45 (1983) 183-185.	
	CD1	Boolchand, P., Bresser, W.J., Compositional trends in glass transition temperature (T _g), network connectivity and nanoscale chemical phase separation in chalcogenides, Dept. of ECECS, Univ. Cincinnati (October 28, 1999) 45221-0030.	
	CE1	Boolchand, P.; Grothaus, J., Molecular Structure of Melt-Quenched GeSe ₂ and GeS ₂ glasses compared, Proc. Int. Conf. Phys. Semicond. (Eds. Chadi and Harrison) 17 th (1985) 833-36.	
	CF1	Bresser, W.; Boolchand, P.; Suranyi, P., Rigidity percolation and molecular clustering in network glasses, Phys. Rev. Lett. 56 (1986) 2493-2496.	
	CG1	Bresser, W.J.; Boolchand, P.; Suranyi, P.; de Neufville, J.P., Intrinsically broken chalcogen chemical order in stoichiometric glasses, Journal de Physique 42 (1981) C4-193-C4-196.	
	CH1	Bresser, W.J.; Boolchand, P.; Suranyi, P.; Hernandez, J.G., Molecular phase separation and cluster size in GeSe ₂ glass, Hyperfine Interactions 27 (1986) 389-392.	
	CI1	Cahen, D.; Gilet, J.-M.; Schmitz, C.; Chernyak, L.; Gartsman, K.; Jakubowicz, A., Room-Temperature, electric field induced creation of stable devices in CuInSe ₂ Crystals, Science 258 (1992) 271-274.	
	CJ1	Chatterjee, R.; Asokan, S.; Titus, S.S.K., Current-controlled negative-resistance behavior and memory switching in bulk As-Te-Se glasses, J. Phys. D: Appl. Phys. 27 (1994) 2624-2627.	
	CK1	Chen, C.H.; Tai, K.L., Whisker growth induced by Ag photodoping in glassy GexSe _{1-x} films, Appl. Phys. Lett. 37 (1980) 1075-1077.	
	CL1	Chen, G.; Cheng, J., Role of nitrogen in the crystallization of silicon nitride-doped chalcogenide glasses, J. Am. Ceram. Soc. 82 (1999) 2934-2936.	
	CM1	Chen, G.; Cheng, J.; Chen, W., Effect of Si ₃ N ₄ on chemical durability of chalcogenide glass, J. Non-Cryst. Solids 220 (1997) 249-253.	
	CN1	Cohen, M.H.; Neale, R.G.; Paskin, A., A model for an amorphous semiconductor memory device, J. Non-Cryst. Solids 8-10 (1972) 885-891.	
	CO1	Croitoru, N.; Lazarescu, M.; Popescu, C.; Telnic, M.; and Vescan, L., Ohmic and non-ohmic conduction in some amorphous semiconductors, J. Non-Cryst. Solids 8-10 (1972) 781-786.	
	CP1	Dalven, R.; Gill, R., Electrical properties of beta-Ag ₂ Te and beta-Ag ₂ Se from 4.2 to 300K, J. Appl. Phys. 38 (1967) 753-756.	
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	CR1	Dearnaley, G.; Stoneham, A.M.; Morgan, D.V., Electrical phenomena in amorphous oxide films, Rep. Prog. Phys. 33 (1970) 1129-1191.	
	CS1	Dejus, R.J.; Susman, S.; Volin, K.J.; Montague, D.G.; Price, D.L., Structure of Vitreous Ag-Ge-Se, J. Non-Cryst. Solids 143 (1992) 162-180.	
	CT1	den Boer, W., Threshold switching in hydrogenated amorphous silicon, Appl. Phys. Lett. 40 (1982) 812-813.	
	CU1	Drusedau, T.P.; Panckow, A.N.; Klabunde, F., The hydrogenated amorphous silicon/nanodisperse metal (SIMAL) system-Films of unique electronic properties, J. Non-Cryst. Solids 198-200 (1996) 829-832.	
	CV1	El Bouchairi, B.; Bernede, J.C.; Burgaud, P., Properties of Ag _{2-x} Se _{1+x/n} -Si diodes, Thin Solid Films 110 (1983) 107-113.	

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	CW1	El Gharras, Z.; Bourahla, A.; Vautier, C., Role of photoinduced defects in amorphous GexSe1-x photoconductivity, J. Non-Cryst. Solids 155 (1993) 171-179.	
	CX1	El Ghrandi, R.; Calas, J.; Galibert, G.; Averous, M., Silver photodissolution in amorphous chalcogenide thin films, Thin Solid Films 218 (1992) 259-273.	
	CY1	El Ghrandi, R.; Calas, J.; Galibert, G., Ag dissolution kinetics in amorphous GeSe5.5 thin films from "in-situ" resistance measurements vs time, Phys. Stat. Sol. (a) 123 (1991) 451-460.	
	CZ1	El-kady, Y.L., The threshold switching in semiconducting glass Ge21Se17Te62, Indian J. Phys. 70A (1996) 507-516.	
	CA2	Elliott, S.R., A unified mechanism for metal photodissolution in amorphous chalcogenide materials, J. Non-Cryst. Solids 130 (1991) 85-97.	
	CB2	Elliott, S.R., Photodissolution of metals in chalcogenide glasses: A unified mechanism, J. Non-Cryst. Solids 137-138 (1991) 1031-1034.	
	CC2	Elsamanoudy, M.M.; Hegab, N.A.; Fadel, M., Conduction mechanism in the pre-switching state of thin films containing Te As Ge Si, Vacuum 46 (1995) 701-707.	
	CD2	El-Zahed, H.; El-Korashy, A., Influence of composition on the electrical and optical properties of Ge20BixSe80-x films, Thin Solid Films 376 (2000) 236-240.	
	CE2	Fadel, M., Switching phenomenon in evaporated Se-Ge-As thin films of amorphous chalcogenide glass, Vacuum 44 (1993) 851-855.	
	CF2	Fadel, M.; El-Shair, H.T., Electrical, thermal and optical properties of Se75Ge7Sb18, Vacuum 43 (1992) 253-257.	
	CG2	Feng, X.; Bresser, W.J.; Boolchand, P., Direct evidence for stiffness threshold in Chalcogenide glasses, Phys. Rev. Lett. 78 (1997) 4422-4425.	
	CH2	Feng, X.; Bresser, W.J.; Zhang, M.; Goodman, B.; Boolchand, P., Role of network connectivity on the elastic, plastic and thermal behavior of covalent glasses, J. Non-Cryst. Solids 222 (1997) 137-143.	
	CI2	Fischer-Colbrie, A.; Bienenstock, A.; Fuoss, P.H.; Marcus, M.A., Structure and bonding in photodiffused amorphous Ag-GeSe2 thin films, Phys. Rev. B 38 (1988) 12388-12403.	
	CJ2	Fleury, G.; Hamou, A.; Viger, C.; Vautier, C., Conductivity and crystallization of amorphous selenium, Phys. Stat. Sol. (a) 64 (1981) 311-316.	
	CK2	Fritzsche, H., Optical and electrical energy gaps in amorphous semiconductors, J. Non-Cryst. Solids 6 (1971) 49-71.	
	CL2	Fritzsche, H., Electronic phenomena in amorphous semiconductors, Annual Review of Materials Science 2 (1972) 697-744.	
	CM2	Gates, B.; Wu, Y.; Yin, Y.; Yang, P.; Xia, Y., Single-crystalline nanowires of Ag2Se can be synthesized by templating against nanowires of trigonal Se, J. Am. Chem. Soc. (2001) currently ASAP.	
	CN2	Gosain, D.P.; Nakamura, M.; Shimizu, T.; Suzuki, M.; Okano, S., Nonvolatile memory based on reversible phase transition phenomena in telluride glasses, Jap. J. Appl. Phys. 28 (1989) 1013-1018.	
	CO2	Guin, J.-P.; Rouxel, T.; Keryvin, V.; Sangleboeuf, J.-C.; Serre, I.; Lucas, J., Indentation creep of Ge-Se chalcogenide glasses below Tg: elastic recovery and non-Newtonian flow, J. Non-Cryst. Solids 298 (2002) 260-269.	
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	CQ2	Gupta, Y.P., On electrical switching and memory effects in amorphous chalcogenides, J. Non-Cryst. Sol. 3 (1970) 148-154.	
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CS2	Haifz, M.M.; Ibrahim, M.M.; Dongol, M.; Hammad, F.H., Effect of composition on the structure and electrical properties of As-Se-Cu glasses, J. Apply. Phys. 54 (1983) 1950-1954.	
CT2	Hajto, J.; Rose, M.J.; Osborne, I.S.; Snell, A.J.; Le Comber, P.G.; Owen, A.E., Quantization effects in metal/a-Si:H/metal devices, Int. J. Electronics 73 (1992) 911-913.	
CU2	Hajto, J.; Hu, J.; Snell, A.J.; Turvey, K.; Rose, M., DC and AC measurements on metal/a-Si:H/metal room temperature quantised resistance devices, J. Non-Cryst. Solids 266-269 (2000) 1058-1061.	
CV2	Hajto, J.; McAuley, B.; Snell, A.J.; Owen, A.E., Theory of room temperature quantized resistance effects in metal-a-Si:H-metal thin film structures, J. Non-Cryst. Solids 198-200 (1996) 825-828.	
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CX2	Hayashi, T.; Ono, Y.; Fukaya, M.; Kan, H., Polarized memory switching in amorphous Se film, Japan. J. Appl. Phys. 13 (1974) 1163-1164.	
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CZ2	Helbert et al., Intralevel hybrid resist process with submicron capability, SPIE Vol. 333 SUBMICRON LITHOGRAPHY, pp. 24-29 (1982).	
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CB3	Hosokawa, S., Atomic and electronic structures of glassy GexSe1-x around the stiffness threshold composition, J. Optoelectronics and Advanced Materials 3 (2001) 199-214.	
CC3	Hu, J.; Snell, A.J.; Hajto, J.; Owen, A.E., Constant current forming in Cr/p+a-/Si:H/V thin film devices, J. Non-Cryst. Solids 227-230 (1998) 1187-1191.	
CD3	Hu, J.; Hajto, J.; Snell, A.J.; Owen, A.E.; Rose, M.J., Capacitance anomaly near the metal-non-metal transition in Cr-hydrogenated amorphous Si-V thin-film devices, Phil. Mag. B. 74 (1996) 37-50.	
CE3	Hu, J.; Snell, A.J.; Hajto, J.; Owen, A.E., Current-induced instability in Cr-p+a-Si:H-V thin film devices, Phil. Mag. B 80 (2000) 29-43.	
CF3	Iizima, S.; Sugi, M.; Kikuchi, M.; Tanaka, K., Electrical and thermal properties of semiconducting glasses As-Te-Ge, Solid State Comm. 8 (1970) 153-155.	
CG3	Ishikawa, R.; Kikuchi, M., Photovoltaic study on the photo-enhanced diffusion of Ag in amorphous films of Ge2S3, J. Non-Cryst. Solids 35 & 36 (1980) 1061-1066.	
CH3	Iyetomi, H.; Vashishta, P.; Kalia, R.K., Incipient phase separation in Ag/Ge/Se glasses: clustering of Ag atoms, J. Non-Cryst. Solids 262 (2000) 135-142.	
CI3	Jones, G.; Collins, R.A., Switching properties of thin selenium films under pulsed bias, Thin Solid Films 40 (1977) L15-L18.	
CJ3	Joullie, A.M.; Marucchi, J., On the DC electrical conduction of amorphous As2Se7 before switching, Phys. Stat. Sol. (a) 13 (1972) K105-K109.	
CK3	Joullie, A.M.; Marucchi, J., Electrical properties of the amorphous alloy As2Se5, Mat. Res. Bull. 8 (1973) 433-442.	
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